

# CORAL USES AND PERSPECTIVES ON SUSTAINABLE DEVELOPMENT IN SOLOMON ISLANDS

During a recent visit to Solomon Islands, staff from SPC's Aquaculture Section and the Solomon Islands Ministry of Fisheries and Marine Resources (MFMR) visited the Western and the Central Provinces and gathered information on the wild harvesting and farming of corals.

## TRADITIONAL AND MODERN CORAL USE IN SOLOMON ISLANDS

For many years, the wild collection of corals has brought substantial income to rural communities in many provinces in Solomon Islands. Wild coral harvesting caters to three main markets:

1. Local trade (as a source of lime for chewing with betelnut);
2. Curio trade (dead corals)
3. Marine aquarium trade (live corals)

## Lime production

In Solomon Islands, chewing betelnut is a long-standing and common tradition. Calcium carbonate is the active ingredient of lime and forms the basis of the skeletal structure of staghorn corals (*Acropora* spp.), which are harvested on the reef.

All Solomon Islanders, especially those who chew betelnut, are familiar with lime. **Daka** or leaf, lime and betelnut are all essential ingredients in betelnut chewing because without one of these, the desired taste cannot be achieved. Betelnut chewing is part of Solomon Islands traditional culture and enhances socialization among people.

*Antoine Teitelbaum*  
**Aquaculture Officer**  
*SPC, Noumea*  
*New Caledonia*  
*(AntoineT@spc.int)*

However, today many people do not chew betelnut due to religious restrictions (Seventh-Day Adventists and evangelical churches).

Lime production is as follows.

- Corals are harvested from their habitat using light crow-bars or other tools. Harvesting duration depends on the amount of coral required. In some provinces, coastal communities gather great amounts of coral in the waters near their villages. This coral is then stockpiled.

- All harvested corals are then sun-dried for over 10 days. After drying, the corals appear bleached because the live tissue has died.
- The bleached corals are burned on a fire. Dried mangrove wood is the best fuel to use because they burn slowly, and produce good heat. The wood is stacked as when making a **motu** (traditional oven).
- The corals are burned until they turn into ashes (lime). The lime is collected and stored in coconut woven baskets or bamboo stalks. These are then stored in the warmest part of the kitchen above the fireplace.

- The lime is now ready to be stored in various types and sizes of bottles to be sold to betelnut consumers. It is important that lime is stored in airtight containers to avoid humidity.

Lime is sold in local markets through the barter system. The price for lime ranges from



**Staghorn corals used for the production of lime.**

SBD1.00 to SBD10.00 depending on the quantity sold. Lime is not an export commodity in Solomon Islands, therefore the Ministry of Fisheries has no data on its production.

#### Bleached corals for the curio trade

In Solomon Islands, the use of corals for the curio trade began in 1984. It was then stopped by the government in 1994 but restarted again in 2003. According to MFMR's data, 20,000 pieces were exported in 2004 (Lal and Kinch, 2005)<sup>1</sup>.

This activity is a substantial source of cash for coastal communities. *Acropora* spp., *Pocillopora* spp., *Turbinaria* spp., *Helipora* spp., and *Seriatopora* spp. are harvested on reefs (especially in Central and the Guadalcanal provinces) then sun dried and bleached. These are shipped by sea, in containers, to the USA where they are sold as curios.

#### Harvesting corals for the ornamental trade

Corals harvested for export for the ornamental trade generate the highest incomes. Most of this activity takes place around the Nggela group in Central Province. Inhabitants of Buenavista, Sandfly and Nggela islands have been collecting corals since the mid-1990s. In 1996, 175,000 pieces of live coral were exported for the ornamental trade.

Villagers often operate in groups under an informal cooperative, harvesting live corals as a cash income mostly on a part-time basis. Of the 200 people involved in the collection of marine ornamentals in Solomon Islands, it is estimated that 25% are focusing on the collection of coral fragments.

Around 70 species of corals are harvested for the ornamental trade. The most popular orders requested by Honiara-based exporters to village fishers are

for the following genera: *Euphyllia* spp., *Acropora* spp., *Montipora* spp., *Sarcophyton* spp., *Sinularia* spp., *Ricordia* spp., and *Fungia* spp.

During a recent trip to Central Province, staff from SPC and MFMR met with a group of coral fishers from Leitongo village in the Sandfly Islands. Henry Kaoni, chief of the collectors, outlined his practices and shared his concerns with the team. For 13 years, fishers from Leitongo have been harvesting corals that are mainly sold to Solomon Islands Marine Export (SIME) in Honiara. Over 2000 pieces of corals can be sold each week. Each piece sells for between SBD2 and SBD2.5. Coral fishers are becoming increasingly worried that coral resource in their surrounding waters seem to be suffering by this activity, and while the cost of living has increased, the price of corals has remained the same.

Later, the SPC/MFMR team met with a group of collectors in a mangrove stand. This area had a very diverse population of hard coral species. Although freshwater runoff has caused mortality in the surface layers, healthy coral colonies were observed in the deeper parts of the mangrove. Collectors use a dugout canoe as the collection vessel and take turns diving. The group harvests corals with a screw driver or chisel. Coral fragments are then placed in a plastic basket on top of a layer of mangrove leaves. On the day of the visit, the SPC/MFMR team observed a harvest of *Lobophyllia* spp., *Euphyllia* spp., *Ricordia* spp., and *Merulina* spp.

Back at the village, the corals are placed underwater in surrounding areas, to ease the acclimatization of the freshly harvested



Wild caught coral in the Nggela.

<sup>1</sup> Lal P. and Kinch J. 2005. Financial assessment of the marine trade of corals in Solomon Islands. Report prepared for the Foundation of the Peoples of the South Pacific International, Suva, Fiji; South Pacific Regional Environment Programme, Apia, Samoa; Department of Fisheries and Marine Resources and Forestry and Environment and Conservation, Ministry of Natural Resources, the Solomon Islands Government, Honiara, Solomon Islands. C-SPODP II. 32 p.

colonies. The day before they are exported, the corals are taken to Honiara (1–1.5 hours by boat) and placed at SIME's facilities. Coral colonies are sorted, graded and placed in the raceways of SIME's re-circulating system. On the day of export, the corals are bagged with oxygen, boxed, and sent to the airport.

**WHAT IS THE FUTURE OF FARMED CORALS?**

The sustainability of the wild caught coral trade is questionable. In the late 1990s, the first trials of coral aquaculture started in Marau Sound in Guadalcanal Province. Of the 30 farmers that were trained and equipped for that purpose, only a few individuals adopted the technology and produced farmed coral fragments. Between 2000 and 2004, farmed corals accounted for only a small fraction (on average 1.6%)

of the total amount of corals exported from the Solomon Islands (see table below).

The financial assessment produced by Lal and Kinch in 2005 demonstrated that coral culture in Solomon Islands can only be a viable source of income if the following criteria are met.

- Culture operation are developed on a large scale;
- Transport costs to Honiara are shared with those from other activities;
- Transport of coral fragments to Honiara are made at least once a month;
- Villagers fetch better prices for their production.

Since 2004, the number of farmed corals appears to be increasing at an exponential rate. Official export statistics

show an increase from 600 pieces in 2004 to 1600 in 2005, and more than 7000 pieces in 2006. These figures are from the production of 1 farmer in Central Province, 8 farmers in the Marau Sound area, and 6 farmers in Western Province.

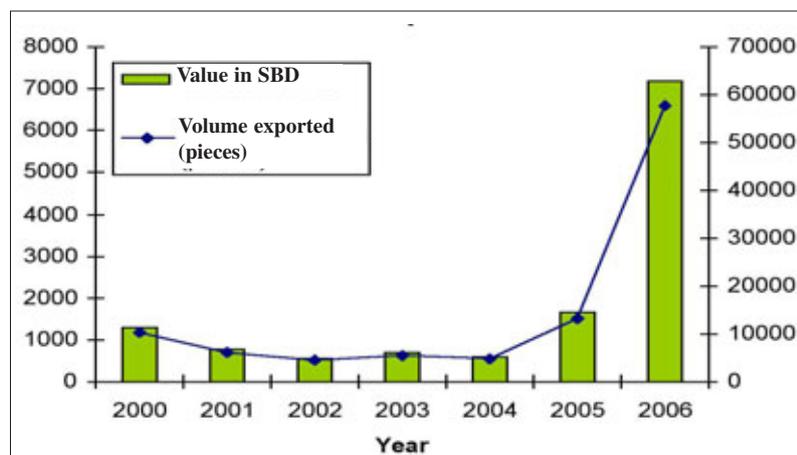
The international ornamental coral market is demanding more cultured corals because they adapt better to aquarium conditions and they are regular in sizes, colours and shapes for a given species. Furthermore, farming corals is seen as an 'eco-friendly' practice, compared with the wild harvesting of corals.

Unfortunately, in Solomon Islands, coral farming is limited by the following factors.

- The demand for wild caught corals is still high and they are cheaper products for exporters;
- Only a few species of corals can be cultured (fast growing ones); a larger number of wild caught species can be obtained;
- There are only two shipments of live stock per week. Most available airfreight space is already used by aquarium fish and wild caught corals;
- Villagers often find it difficult to access basic materials for culture (wire, cement, plastic moulds).

**Number of farmed corals vs number of wild corals exported from Solomon Islands since 2000**

Year	No. of farmed corals (pieces)	No. of wild corals (pieces)	Percentage of farmed vs wild
2000	1299	51,417	2.46%
2001	766	33,250	2.25%
2002	567	40,750	1.37%
2003	686	51,627	1.31%
2004	439	71,017	0.61%



**Export of farmed corals (in pieces) from the Solomon Islands since 2000.**

After further discussions with coral fishers, it appears that catching wild corals is not as profitable as it used to be. Prices are low and collection sites are far away because some nearby areas have been overfished. Culturing areas close to villages makes this activity very attractive. Further more, farmed corals fetch higher prices than wild caught corals: farmed



**Lagoon house used for farming activities in Sandfly island.**

corals are currently marketed at SBD8 per piece.

Not all coral species can be farmed. Some have slow growth rates, and others do not adapt to farming conditions. However, for those that can be easily farmed, it makes sense that cultured fragment should slowly replace wild caught for a given species, for both soft and hard corals. For example, *Acropora* spp., *Montipora* spp., *Sarcophyton* spp., and *Sinularia* spp. are very easy to farm and have fast growth rates.

**COULD STOCK MANAGEMENT, LABELS AND REGULATIONS HELP DEVELOP THE CORAL AQUACULTURE INDUSTRY?**

The WorldFish Center and the Marine Aquarium Council (MAC) are currently working together in drafting a 'Mariculture Area Management Plan', with financial assistance from the New Zealand Agency for International Development (NZAID). Management plans are established within local communities that are involved in the aquaculture of clams and corals within Western Province. The goal is to obtain MAC certi-

fication of the products. For example, villagers are taught to commercialize third generation corals only, and good practices for fragmenting and handling are demonstrated. Recently, three workshops, on corals, giant clams and post larval capture and culture techniques, were carried by the WorldFish Center at the Nusa Tupe field station in Western Province.

Obtaining MAC certification will help Solomon Islands products by adding value and will help farmed marine ornamental

products in gaining recognition on the global ornamental trade.

So far, regulations on coral harvesting in Solomon Island are basic (see boxed text below). However, a license is required for exporting corals overseas. The introduction of quotas on wild caught fragments would help in promoting farming activities.

**WHAT WILL MFMR DO?**

Although the global ornamental market is growing, MFMR understands that harvesting and culturing of corals can only be a source of income for a limited number of coastal communities.

However, MFMR wishes to regulate the wild caught harvesting while promoting farming activities. The following actions will be MFMR's priority as part of the national aquaculture development plan.

- Assist the private sector in developing in a sustainable way (i.e. promoting and supporting farming);
- Encourage competition by providing a limited number of licenses;

**CORALS & CORAL SAND**

- **Except under the written permit granted by the Under Secretary of Fisheries;**
  - a) **It is illegal to take or collect dead or live coral or coralsand from any designated area.**
  - b) **It is illegal to use machines for the extraction of coral gravel and coral sand.**

"a" shall not apply to the:

- i) taking or collecting of lime coral for the sole purpose of producing by traditional method limes for consumption with betel nut.
- ii) clearing of a passageway through any reef area, provided that such clearing has been duly authorised by appropriate authorities

**Penalty: for both offence: \$100 fine or 3 months imprisonment or both such fine and imprisonment.**

- Assess how many households will benefit from farming activities and support accordingly;
- Develop a strategy that will progressively replace wild caught corals by farmed corals (for fast growing species);

- Train provincial fisheries assistants in coral farming techniques; they in turn will be able to train villagers.

For further reading, see the report of the Foundation of the Peoples of the South Pacific, International (FSPI), 'Financial assessment of the marine trade

of corals in Solomon Islands', written by Lal and Kinch, 2005.

[http://www.fspi.org.fj/program/coastal/research\\_and\\_development\\_reports.htm](http://www.fspi.org.fj/program/coastal/research_and_development_reports.htm)



**Mother colonies used for producing coral cuttings.**

**Culture of *Acropora* fragments.**

